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# Coexistence and Culture: Understanding Human Diversity and Tolerance in Human-Elephant Interactions

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There is a growing recognition of the importance of conservation beyond protected areas, in spaces of human-wildlife coexistence. Negative human-wildlife interactions are a key challenge, but a better understanding of the forms of tolerance and mutual accommodation would be useful for coadaptation toward coexistence. To date, however, studies of human-wildlife often have been limited by a largely quantified positivist epistemology, which elides the diverse cultural and ecological contexts which enable tolerance and coexistence between humans and wildlife to develop and adhere. In Gudalur, a plantation landscape in South India, about 150 elephants share space with a quarter of a million people. Using a quantified survey coupled with ethnographic fieldwork, we aim to better understand human diversity and tolerance of elephants that allows for coexistence. We find a marked difference between communities, with ethnicity being a better predictor of tolerance than the more tangible socio-economic or geographic variables such as income, education, land holding or cropping patterns. Using qualitative data, we identify three socio-cultural variables that are relevant to tolerance—a shared history of living with elephants, mode of subsistence and type of agricultural crops, and most importantly, ontology or the fundamental understanding of “what is an elephant?” Hunter-gatherer conceptualisations of elephants as “other-than-human persons” prove to be the ontological stance best suited to coexistence, as it allows for elephant individuality and interpersonal negotiations of shared space, which is limited in other world-views, including the worshiping of elephants as Ganesha, the elephant headed deity in the Hindu Pantheon. Having identified some important differences among ethnic communities in human-elephant interactions, we consider the implications of the research for improving the management and practice of human-wildlife coexistence not only in the Nilgiri region but within the broader context of conservation and development.

**Keywords:** human-elephant interactions, Asian elephant, *Elephas maximus*, tolerance, indigenous worldviews, human-elephant conflict, human-wildlife conflict, Nilgiri Biosphere Reserve

## INTRODUCTION

Protected areas (PAs) have formed the backbone of nature conservation, but there is a growing move to look beyond the PAs, taking larger landscape level approaches that incorporate multiple land use types and integrate the needs of wildlife and people (e.g., Jonas et al., 2014; Moola and Roth, 2019). This is particularly relevant for large mammals whose home ranges do not correspond with or are often larger than the designated reserves (Douglas-Hamilton et al., 2005). In a country like India, home to two-thirds of the world's Asian elephants (*Elephas maximus* L.) and tigers (*Panthera tigris* L.), sharing space with 1.4 billion people at a relatively high density of over 400 people/km<sup>2</sup> (Mathur and Sinha, 2008), coexistence with wildlife is vital. The major challenge with people and large wild animals sharing space is potential human-wildlife conflict (HWC) since they purportedly all competed for space and resources (Pimm et al., 1995). There was been a deluge of literature on the subject, particularly since 2003 when it was formally defined at the Fifth IUCN World Parks Congress in Durban, South Africa. HWC in this early definition was primarily about the negative impact people and wildlife had on each other since there was an inherent competition for space and resources, but the term has since been criticized as these negative impacts do not constitute “conflict” in the dictionary sense of the term with people and wildlife as conscious antagonists (Peterson et al., 2010). The majority of studies tagged with HWC refer to conflict between different groups of people with differing opinions about conservation, termed “conservation conflict” (Redpath et al., 2015). Despite this problematic framing of HWC, the literature continues to grow; there are over 59,000 journal articles with “human-wildlife conflict” as a key phrase as of 2021, growing at about five papers a week<sup>1</sup>. This burgeoning literature is largely comprised of case studies from different parts of the world, documenting instances of HWC and the negative impacts on either wildlife or people, often attempting to quantify the economic, ecological and sometimes the social damage caused by these negative interactions.

Discussions around coexistence are relatively recent, described as “a sustainable though dynamic state, where humans and wildlife co-adapt to sharing landscapes and human interactions with wildlife are effectively governed to ensure wildlife populations persist in socially legitimate ways that ensure tolerable risk levels” (Pooley et al., 2021). What consists of “tolerable risk levels,” is one of the more significant themes to emerge in the current literature; the variety of attitudes and orientations that people hold toward wildlife—which can be measured and quantified to better understand their perceptions of conflict, and to better understand tolerance to wildlife in their environs or livelihood space (Lute et al., 2016; Wilbur et al., 2018). Some of the most cited articles suggest that the likelihood of retaliatory killing is not related to the economic and financial loss the wild animals caused, but more to other social beliefs and peer group norms (Dickman, 2010; Treves and Bruskotter, 2014; Gangaas et al., 2015), including such things as spiritual beliefs

and religious group affiliation (Hazzah et al., 2009). How tolerant people are to HWC, findings suggest, depends more on their cultural constructions of coexistence with specific animals than their calculus of the economic costs or benefits of coexistence (Kansky and Knight, 2014) and people's beliefs about wildlife population trends, behavior and ecology takes priority over their real interactions with the animals and the damage they cause (Inskip et al., 2016).

The human dimension of HWC (e.g., Manfredo and Dayer, 2004; Dickman, 2010; Young et al., 2010; Redpath et al., 2013) is a significant part of the literature, and the focus is on better understanding the range of variables that correlate with tolerance as a basis for the development of human-wildlife coexistence. If the capacity for tolerance and mutual accommodation is lacking, the requisite conditions for coexistence, including coadaptation, often fail to develop or adhere. Tolerance itself is not instinctual, but rather a learned behavior in both human and wildlife populations, and thus rife with historical and of-the-moment contingencies, perceptions, and options for engagement. Understanding the complexity that informs tolerance and its relationship to HWC and coexistence thus necessitates a better understanding of the complex sociocultural and ecological contexts that inform human-wildlife interactions.

What is often missing from the present HWC narratives and debates, however, is precisely this deeper engagement with diverse cultures and ecologies from other disciplinary perspectives, particularly the critical social sciences. Anthropologists, for example, have been critical of the discourse on HWC being dominated by the natural sciences (Nelson, 1995; Knight, 2000). The existing literature on HWC or tolerance seldom adopts an ethnographic or non-Western cultural perspective and fails to delve deeper into human-wildlife interactions beyond a set of quantified variables. Yet, focused ethnographic studies on HWC provide deeper insights on what it means to coexist and ‘live with’ animals from indigenous cultural perspectives and lifeways, typically evolved *in situ* and *in vivo* with said animals over centuries if not millennia (Nelson, 1995). This is particularly relevant for the coexistence of humans and elephants, where elephants are often thought of as other-than-human persons (Ingold, 2000), especially so in South Asia with a long history of human-elephant entanglement (Locke, 2013, 2017).

It is this ethnographic gap in the literature and methodology of HWC studies that we seek to address here, to understand tolerance of elephants that allows for coexistence. We pose the question—*How are people differently tolerant to elephants around them, and what are the underlying cultural factors that affect this tolerance and facilitate coexistence?* To answer this question, we use a mix of quantitative and qualitative methods. First we conduct a broad scale assessment of the level of tolerance to elephants and how this varies between different ethnic communities, using a detailed questionnaire survey. Second, we deploy an ethnographic approach of participant observation and conflict tracking to delve deeper into the idea of tolerance and what allows some communities to avoid HWC and coexist more peaceably with elephants than others. In particular we focus on diverse cultural beliefs about elephants and how these inform

<sup>1</sup> Based on a search in the database Scopus in March 2021.

**TABLE 1** | Summary of ethnic communities.

Ethnic/stakeholder groups	Indigenous	Scheduled tribe	Subsistence mode/occupation	Legal land owners	Interaction with elephants	Approx. population
Forest department/conservation NGOs	No	No	Government employment/salaried and temporary residence or non-resident in the Nilgiris	n/a	High	n/a
Kattunayakan	Yes	Yes	Traditionally Hunter-Gatherer (HG) and now occupied in wage labor, but still most forest dependent of all the tribes.	No	High	<1%
Bettakurumba	Yes	Yes	Traditionally HG, now also occupied in wage labor, with a number of them working for the forest department, particularly as <i>mahouts</i> .	No	High	1%
Paniya	Yes	Yes	Also traditionally HG, but now mostly occupied in wage labor	No	Moderate	6%
Mullukurumba	Yes	Yes	Settled agriculturalists (SA), with a significant number of them currently employed in Government jobs.	Yes	Low	<1%
Chettys	Yes	No	SA, now also involved in small local businesses	Yes	Moderate	10%
Early Planters	No, 1900's onwards	No	Tea/Coffee plantation owners and workers, again with younger generation mostly in other parts of the country/world.	Yes	High	30%
Malayalis	No, arrived 1940's onwards	No	Agriculturalists, though mostly growing cash crops, with the educated younger generation moving to urban centers.	No	Low	17%
Sri Lankan Tamils	No, 1980's onwards	No	Wage laborers and small-scale cash crop farmers	No	Moderate	35%

communities' responses to elephants. This approach helps us to identify cultural drivers of human-elephant coexistence.

## METHODOLOGY

### Study Region and Its People

The quantitative surveys were carried out in a small study site of about 10 km<sup>2</sup>, immediately south of Mudumalai Tiger Reserve (MTR) in Tamilnadu, India, to (a) ensure as much uniformity as possible in terms of the nature of human-elephant interactions, and (b) minimize unidentified confounding variable that may affect tolerance. The villages within 500 m of the southern edge of MTR were chosen using a GIS software (QGIS v2.0), from 76.530°E, 11.533°N to 76.465°E, 11.577°N. Out of a total of nine communities who reside in the region (**Table 1**), the smaller subset of study area we sampled included communities from five different ethnic backgrounds and histories. A total of 20 semi-structured interviews were conducted with key informants—members of the communities who were considered elders or leaders—to understand the background and context. These interviews provided insights into the frequency and nature of human elephant interactions as well as some overarching perceptions around the seriousness of the problem. These preliminary results were used to formulate a questionnaire, described below.

The qualitative work was carried out in the wider region including the entire Gudalur Forest Division south of the Mudumalai Tiger Reserve (MTR), and adjacent human-modified areas covering about 580 km<sup>2</sup>. Gudalur is surrounded by a

network of protected areas comprising parts of the 5,500 km<sup>2</sup> Nilgiri Biosphere Reserve (NBR), declared by the United Nations Educational, Scientific and Cultural Organization (UNESCO) in 1986. The biosphere forms part of the Western Ghats-Sri Lanka biodiversity hotspot, the 8<sup>th</sup> hottest hotspot in the world (Myers et al., 2000) and home to numerous endemic and endangered species, leading to its recognition as a UNESCO World Heritage Site in 2012. This landscape holds the largest Asian Elephant (*Elephas maximus*) and tiger (*Panthera tigris*) populations in the world (Johnsingh et al., 2008).

The people inhabiting the region have also been the subject of numerous anthropological studies, with Hockings (2008, p. 2) claiming that it “would be no exaggeration to assert that the Nilgiris district has been more closely and thoroughly studied by more anthropologists, throughout the entire history of their discipline, than has any other district in Southern Asia, or perhaps anywhere.” In addition to the Indigenous people in the region (who now constitute a minority) there have been waves of immigration over the last two centuries, resulting in a very heterogeneous population, with varying cultures, histories, tenure over land, and modes of subsistence, summarized in **Table 1**. The region is also experiencing rapid changes in land use, expanding tourism and urbanization, alongside growing populations of large mammals (Puyravaud and Davidar, 2013), putting animals and people into much greater contact. From a traditional conservation biology perspective, the region is a human-wildlife conflict hotspot since a large number of people and wild animals share space (Baskaran et al., 2012).

The five ethno-linguistic communities<sup>2</sup> living immediately south of MTR in the quantitative study site were—Kattunayakans, Bettakurumbas, Paniyas, Chettys and Malayalis. The remaining four communities (or in some cases “stakeholder groups,” which we discuss further in the qualitative results) occupying the wider region were Sri Lankan Tamils, Early Planters, Mullukurumbas and Forest Department/Conservation NGOs (Table 1). The Forest Department (supported by Conservation NGOs and wildlife conservationists), and the early planters are also key stakeholder groups, even if not an ethnic community and their perceptions of elephants were also recorded.

## Methods

The quantitative work was centered around a questionnaire to measure tolerance. To this end, first various statements about purportedly negative human-wildlife interactions were formulated based on the qualitative semi-structured interviews that explored what tolerance means in the local context or cultural perspective (or model, cf. Kempton et al., 1996; Thornton et al., 2020) of HWC. These statements were formulated around the ideas that (1) human and wildlife spaces should be separated, given that space was shared with animals it was inevitable that there will be (2) disruption to daily life (3) some degree of property and crop damage (4) some livestock depredation (5) Some human injury or even death, and (6) rising crop damage is because of changing crop patterns and (7) human injury or death was often on account of negligence. In the questionnaire pilot, the respondents found it difficult to answer questions on a “fine-grained” 5-point Likert scale popular in studies of this kind (Grenier, 1998). Therefore, a 3-point scale was chosen. The responses to these seven questions were noted as “disagree,” “can’t say,” or “agree,” ranked –1, 0 or +1 depending on how tolerant the response was.

A range of other explanatory variables were also collected: gender, occupation, education level, income level, ethnic community, land area, types of crops and how attractive they were for wild animals, how much they used the forests, which animals were perceived as problems and frequency of interaction and conflict with these animals, and the wildlife friendliness of their mitigations measures. While the focus was on elephants, problems with other animals were also noted. Questionnaires were administered orally by the first author and two research assistants (youth who worked at local charity and had prior experience in administering questionnaire surveys) to 250 respondents spread across all the villages in the study area, with 50 respondents sampled from each of the five ethnic communities (with an attempt to alternate between male and

female respondents). The approximate village-wise distribution of households was obtained from a local NGO and the local government office. The villages in the region merged into each other resulting in an uneven spread of houses through the region. Therefore, Google Earth imagery of the region was also examined to establish the correspondence between the spatial distribution of households and the household records held by the local NGO and the government office. For the tribal communities (who live in relatively more dispersed houses) approximately every third household was sampled, while for the non-tribal communities (who live in relatively more dense settlements) approximately every 5<sup>th</sup> household was sampled. Responses then were coded into a spread sheet (Open Office version 3.2) and later analyzed using statistical software PASW (version 18, formerly called SPSS) and R (both statistical analysis software programmes). These variables are described in Table 2.

Four levels of analysis were undertaken.

- (A) Consistency of Tolerances Score: Cronbach’s  $\alpha$  test was used to measure the internal consistency of the seven questions to measure tolerance (score of  $\geq 0.8$  indicates “good reliability,” (Cronbach, 1951). Given the limitations of this test for uni-dimensionality (Green et al., 1977), factor analysis was also carried out using principal components method of analysis (Costello and Osborne, 2005).
- (B) Difference Between Communities: The Kruskal Wallis H test was then carried out with the ethnic community as the grouping variable, returning ranks for each of the communities. The two tests were then carried out to determine if the difference between the communities was significant. Kruskal Wallis *post hoc* Multiple comparison test in R and a Mann-Whitney U test (Mann and Whitney, 1947).
- (C) Building a Multivariate Model–Predictors of Tolerance: Since most of the variables that could contribute to tolerance were nominal/ordinal, they were coded in a way that would be meaningful in a quantifiable model, as described in Table 2. All variables were then correlated against each other, so that similar variables could be removed.
- (D) Multivariate Regression: The model was set up with tolerance as the dependent variable, and gender, land area and occupation, income, education level, conflict proneness of crops, frequency of interaction with elephants and frequency of interaction with boars<sup>3</sup> as independent variables. Given that all the variables were non-parametric, the categorical regression function in PASW 18 was used.

For the more extensive qualitative body of work, additional ethnographic methods were employed across the wider study region, the Gudalur forest division, including all the 9 communities or stakeholder groups (Table 1). These involved, “the researcher participating... in people’s daily lives for an

<sup>2</sup>The question of indigeneity is much debated in India, and the Government does not acknowledge that any particular groups are indigenous, and instead recognizes some people as “Scheduled Tribes” under the constitution. This is more of an administrative and political construct than an anthropological classification (Singh, 1986). India’s refusal to recognize indigenous people, a status denoting internationally recognized rights to natural resources and more importantly to self-determination is arguably based on a fear that in doing so it will encourage ethnic separatist tendencies jeopardizing the state’s territorial integrity (Karlsson, 2003). The more widely used term in India by the indigenous communities themselves is “Adivasi” or original inhabitant.

<sup>3</sup>Wild boar emerged as another species that caused significant damage in the questionnaire survey, and so frequency of interaction with boar was also noted and included in the quantitative analysis. However, there was little or no discussion around wild boar in the ethnographic fieldwork, with the problem being localized to the edge of the tiger reserve, and it was not further examined in this study.



**TABLE 2 |** Coding of socio-ecological and HWC variables for correlation.

No.	Variable	Coding
1	Gender	Binary; 0/1
2	Occupation	Nominal; 1-4; 1– agricultural laborer, 2–Both agriculturalists and laborer, 3–self-employed agriculturalists, 4–non-agriculture
3	Education level	Ordinal; Ranked 1-4; 1–No formal education, 2–Basic literacy, 3–High School, 4–University
4	Income	Ordinal; Ranked 1-4; (all in INR/month, closest 1–2500, 2–4000, 3–6000, 4–10000, or more
5	Area of land holdings	Ordinal; Ranked 0-4; 0–None, 1–<1 acre, 2–1-5 acres, 3–5-10 acres, 4–More than 10 acres
6	How wildlife-conflict prone the crops were	Ordinal; Ranked 1-4; 1–no land, 2–tea/coffee/pepper, 3–tapioca/ginger/tubers, 4–paddy/bananas
7	Use of forests	Ordinal; Ranked 1-4; 1 for none, 2 for firewood, 3 for forest produce for own consumption, 4 for forest produce for sale
8	Perceived frequency of interaction	Ordinal; Ranked 1-4; Unequally spaced classes with Elephants and Wild Boar
9	Perceived frequency of conflict	Ordinal; Ranked 1-4; Unequally spaced classes with Elephants and Wild Boar
10	Ethnic community	Ordinal; Ordered according to Kruskal Wallis ranks for tolerance

**TABLE 3 |** Summary of quantitative analysis.

Analysis	Result
The different responses to the questions on tolerance were examined for uni-dimensionality and internal consistency; based on which they were aggregated into a single score for each individual.	The seven questions on tolerance did measure the same thing and could be grouped together to create a tolerance index.
Tolerance scores were then grouped according to community to see if a marked difference existed between communities, and a check was performed to determine whether the differences were statistically significant.	There was a marked difference between different community's levels of tolerance to wildlife. With Kattnayakans representing the most tolerant end of the scale and Malayalis representing the least tolerant.
All variables that could contribute to tolerance were then entered in to a multivariate model to determine how significant ethnicity was in comparison with the other variables.	Among all the variables ethnic community was the most significant in predicting tolerance.
The wildlife friendliness of mitigation measures was then examined, and effectiveness of using tolerance to predict this was tested.	Tolerance to wildlife was not a good predictor of the wildlife friendliness of mitigation strategies.

*extended period of time, watching what happens, listening to what is said, and/or asking questions through informal and formal interviews”* (Hammersley and Atkinson, 2007, p. 3), or participant observation. A large number of free flowing discussions occurred while informants were involved in everyday

activities, such as harvesting tea, and often involved stopping work to watch elephants.

The majority of this fieldwork was carried out by the first author, drawing from his experience in the region over the last decade across the 360 or so hamlets and various Indigenous communities in the study region, with in-depth ethnographic fieldwork undertaken in 2015 and 2016. The participant observations were founded on an already established trusting relationship between the first author and the participants through a close interaction over a decade preceding the study.

Finally, HWC incidents were tracked through a crowd sourced elephant monitoring and reporting system (Babu and Thekaekara, 2013) to establish correspondence between the incidents and their ethnographic narratives. Discussions were in multiple languages–Tamil, Malayalam or English. As there were no formal interviews, discussions were not recorded. Local people were also suspicious of conservationists, wildlife researchers and government officials, who often claimed they had encroached onto forest land and should be evicted; recording conversations risked further enhancing their suspicions<sup>4</sup>. At the end of each day, notes were made in English, translating key statements from the discussions relating to human-elephant interactions. Statements relating to interactions and belief with elephants were extracted and grouped together in analysis, and used to describe the varying views across different ethnic communities.

The ethnographic literature was also used, with caution, to describe communities. Despite the large body of anthropological literature from the Nilgiris, much of the early work by non-professionals has proven unreliable (Hockings, 2008). Even the basic classification of the people living in the Gudalur region is unclear, such that contemporary studies of ethnobiology in the Nilgiris (Rajan et al., 2002) or those claiming to provide an anthropological perspective to community-based conservation (Anderson, 2001) confuse different ethnic communities. We therefore relied on our fieldwork to ground truth each of the communities’ specific territory, knowledge, beliefs, and practices informing interactions with elephants, and how this linked to modes of tolerance and coexistence.

## RESULTS

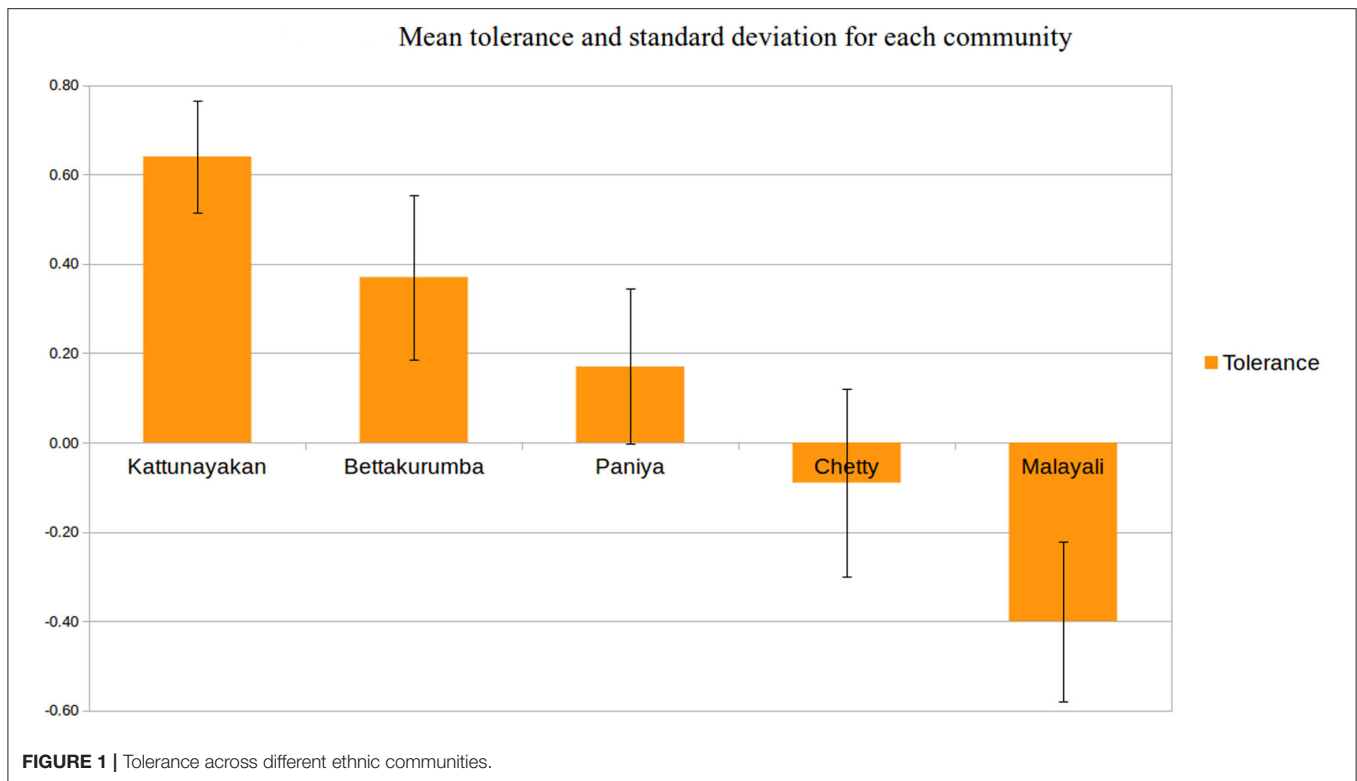
### Quantitative Analysis and Results

Tolerance was the key variable being probed and the following statistical analyses were undertaken (Table 3).

#### Consistency of Tolerance Score

The seven questions to measure tolerance passed Cronbach’s  $\alpha$  test for internal consistency with a score of 0.829, indicating that all the questions were well-correlated with each other. Factor analysis showed that all seven questions loaded significantly onto one component, the only one with an eigenvalue greater than one, indicating that all seven questions could be simplified

<sup>4</sup>For further insights into the high levels of conflict between the state and local people see the popular article: <https://www.thehindu.com/features/magazine/a-fragile-coexistence/article6989721.ece>.



into one factor. Mean “tolerance” score was then computed for each individual.

### Difference Between Communities

The null hypothesis of the Kruskal Wallis H test (that there was no difference in tolerance between the different communities) was rejected, pointing to differences between the communities and returned ranks for each of the communities. The mean tolerance and standard deviation for each community was computed (**Figure 1**). Kruskal Wallis *post hoc* Multiple comparison test in R showed the critical difference in ranks was 40.597 for a  $p$ -value of 0.05, and so communities 1&2 (Malayalis and Chetty), 2&3 (Chetty and Paniyas) and 3&4 (Paniyas and Bettakurumbas) were not significantly different from each other. The Mann-Whitney U test (Mann and Whitney, 1947) between adjacent communities (1&2; 2&3; 3&4; 4&5) returned a  $p < 0.05$  in all cases, indicating that all the communities were significantly different from each other in terms of their tolerance to wildlife.

### Multivariate Model–Predictors of Tolerance

Frequency of interaction and frequency of conflict showed the highest correlation (0.898 for elephant and 0.856 for boar). This is likely the case because interactions tend to be best remembered when there is an anomaly or problem, so only interactions with elephant/boar were used in the model. Ethnic Community and use of forest was correlated (0.746) which was perhaps expected to some degree. Despite rapid changes in the regions and diversification in livelihoods, forest use patterns were broadly linked to ethnic identity and historical relationships

with the forests; hence we removed “use of forests.” Occupation and Land Area were also correlated with each other (0.676), because as land area increases people tend to work less as agricultural laborers and more as self-employed agriculturalists. Factor analysis showed they both loaded significantly on one factor, which was highly correlated (0.997) with the mean of the two, and so these two variables were combined.

### Multivariate Regression

For  $p < 0.05$ , “interaction with elephants,” “interaction with boars,” and “ethnic community” came out as being the only significant predictors of an individual’s level of tolerance, but with ethnic community being the most relevant, with a  $\beta$ -value of 0.744.

In summary, the quantitative analysis found that (1) the seven questions probed the same underlying value of tolerance, (2) The 5 ethnic communities were all significantly different from each other in their tolerance levels, and (3) of all the variables, ethnic community was the most significant predictor of tolerance.

This was a useful starting point. However, from the perspective of investigating elements contributing to more peaceful coexistence with wildlife, it was important to understand the diversity in tolerance among peoples in the study region, and what made some more tolerant of elephants than others. This deeper engagement with the underlying values, beliefs, and practices that led to people being more tolerant was beyond the scope of a questionnaire survey, and in the next Section analyze the relationships that various communities have with

elephants (and more broadly nature) in more depth based on the ethnographic methods deployed.

## Qualitative Results—The Intricacies of Tolerance Across Communities

### Forest Department and Conservation NGOs

Beyond resident communities, the most influential stakeholder group is the Forest Department staff, supported by a range of NGOs and wildlife activists. This is a very diverse group of actors who are not entirely similar in their views and perceptions of elephants, but there remain some broad similarities, where they supposedly represent the voice of the elephants. While comparatively small in number, they set the conservation narrative and policy agenda around elephants. This stakeholder group overlaps with some of the other local communities, where a few individuals are employed as temporary field staff. However, for most local staff, their perceptions of elephants tend to align more with their ethnic identity. Our descriptions of this stakeholder group's beliefs around elephants therefore, does not include the few local inhabitant's views on elephants, and is more representative of the permanent forest department staff, who are periodically transferred to different divisions, and are invariably not long-term local residents.

The Nilgiris has a very large number of registered trusts and societies, the majority of them relating to wildlife and environmental conservation. Yet these NGOs and wildlife activists have little or no real interaction with elephants on the ground. The Nilgiri Wildlife and Environmental Association (NWEA) is an interesting example, being the oldest conservation organization in India. It was established as the Nilgiri Game Association in 1877 by elite Colonial hunters who pushed for the enactment of the Nilgiri Game and Fish Preservation Act in 1879, arguably the first conservation legislation in the country, aimed at controlled hunting. Today the NWEA consists of about 900 members with the highest-ranking government officials all enrolled as ex-officio members. They are able to exert significant pressure in the policy space. Almost every local or national news article on "Human-Elephant Conflict" (HEC) quotes one of the local conservation groups as the expert opinion.

This stakeholder group also engages in judicial activism with significant repercussions on the human-elephant shared space. They have pushed through the establishment of an elephant corridor, which could potentially displace thousands of people, even those with title to their land (Shaji, 2021). They succeeded in banning all night traffic on highways coming through wildlife reserves in the region (triggering significant backlash from local people) (Krishnakumar, 2018), prevented the establishment of an international scientific observatory (Jayaraman, 2009), and stopped the construction of a railway line through the forests. Their overall goals, while not entirely uniform, converge on some basic issues concerning the "saving" of elephants, which resonate with more global conservation narratives of elephants as endemic, flagship, keystone and umbrella species in the ecosystem. In contrast, they consider most people in the region as encroachers who have taken over forest lands for agriculture and reduced elephant habitat. They see this conversion of forest land

into agriculture as the root cause of HEC. In regular encounters between people and elephants, even in cases of people getting accidentally killed, they believe it is the people's behavior toward elephants that is the problem (see Taghioff and Menon, 2010; Thekaekara, 2010 for more discussion on the local politics of conservation). While biologists often focus on the survival of the species as a whole and are not averse to the culling "problem" individuals in a particular locale, for this group the rights of individual elephants throughout the region are also important, and thus they invariably oppose the capturing or killing of any elephants.

### Kattunayakans

Kattunayakans are the most forest dependent of all the communities, as is described by their name: Kattu (forest) Nayakans (rulers). The majority are landless and engage in wage labor with local land owners and the forest department to supplement their hunting and gathering of wild foods and forest produce for consumption and sale.

Kattunayakans (Nayaka) have been the focus of ethnographies by Bird-David (1990, 1992, 1996, 1999, 2006), detailing anthropological perspectives on their unique world view, especially their ontological understanding of elephants as "other-than-human persons" (cf. Hallowell, 1960).

"Nayaka described some elephants as 'devaru'<sup>5</sup>. They did not apply this word to all the elephants...because of their assumed, shared, inert 'elephantness'. Rather, Nayaka used the word for specific elephants, in particular situations...characterized by immediacy not just in the physical sense of close distance, but in a social-phenomenological one" (Naveh and Bird-David, 2014, p. 60).

This ontology is further elaborated with examples; an elephant that carefully walks between houses without damaging them and being respectful toward people, or one which walks past a person and "looked straight into his eyes" and "communicate with him non-verbally" is *aana-devaru* (elephant-person), but an elephant that damages houses, behaves unpredictably, or where there is no mutual engagement, is just an ordinary *aana* (elephant) (Bird-David and Naveh, 2008, p. 60). Such classifications reveal variations in tolerance and divergent dispositions toward coadaptation and coexistence within elephant populations.

Kattunayakans often talk to elephants, particularly the "devaru" elephants that they relate to, as other-than-human persons. As Bird-David and Naveh (2008, p. 63) relate:

"One October night in 2003, elephants entered KK [the village]; they trampled one of the huts, walked through the wetland paddies, and started to eat banana plants. While doing so, they also emitted loud bellows that were heard all over the village. One man went to about eight meters from where the elephants were standing, a distance that, should the need have arisen, would still have enabled him to run away. From there he approached the

<sup>5</sup>While literally translating to 'god', the phrase is more nuanced in the Kattunayakan context, relating to their animistic relationship with elephants and other 'other-than-human persons', rather than the better known Hindu Ganesha the elephant deity.



elephants boldly. In a typical blaming tone he said:  
 “Seri [in this sense ‘ok’], if you want to eat, you silently eat and go. We have children here!”

The elephants, then, stopped bellowing, and a few minutes later went away, out of the village.”

“When a Nayaka finds himself in front of an elephant, he prefers to stand still and, as calmly as possible, to address the elephant in a persuasive tone of voice (characterized both by the tone and by the substance):

“I am not coming to disturb you, or to do any harm to you.”

The most frequently used rhetoric in such cases stresses what is common to both sides of the encounter:

You are living in the forest, I am also living in the forest; you come to eat here, I am coming to take roots (fruits, fire wood, etc.)... I am not coming to do any harm to you” (2008, p. 63–64).

One village is particularly well-known in the region for having very low conflict with elephants, as explained by a resident:

“We have no problem with these elephants. We know them, and they know us. Every year we do *pooja*<sup>6</sup> for *Aane devaru* and ask them not to disturb our village. They listen to us. They don’t come and trouble us here even though there are lots of jack fruit trees, but all the other people in this whole area have lot of problems with elephants” (Therpakolly, October, 2011)<sup>7</sup>.

Agriculture is now wide-spread, and some of the Kattunayakans who are in possession of land also grow crops, in part to prove their occupation of the land. In terms of crop choices, they have all chosen tea or coffee rather than bananas, which are much more lucrative. When questioned about this choice, the immediate answer was “*because elephants will eat them [bananas] of course*” (Therpakolly, July, August, 2010). Coexistence with elephants thus remains a priority for Kattunayakans despite changes in their mode of subsistence.

### Bettakurumbas

There is almost no contemporary literature on the Bettakurumbas, where older literature suggests that they represents remnant populations from the Pallava Dynasty, after its fall during the 7th and 8th century CE. Their relationship with nature stems from their long isolation in the hills (Thurston and Rangachari, 1909).

In their own oral history however, they identify as forest people. Narratives of capturing and taming wild elephants are vibrant in their stories, and they claim that Maharajas depended on them for *keddah*<sup>8</sup> operations, with British and Indian forest

departments continuing this tradition. This is referenced in the early Western literature:

“The Betta Kurumbas are, I am told, excellent elephant *mahouts* (handlers), and very useful at *keddah* (elephant-catching) operations” (Thurston and Rangachari, 1909, p. 162).

“I have heard of a clever Kurumba, who caught an elephant by growing pumpkins and vegetable marrow, for which elephants have a partiality, over a pit on the outskirts of his field” (1909:163).

Even today, one of the main occupations in the community is looking after the captive elephants as *mahouts* (elephant handlers), and working for the forest department in the in the neighboring PA. An excerpt from discussions with some *mahouts* brings out a version of elephant capture rather different from the *keddah* operations:

“In the old days there was no fuss like there is now to capture elephants; hundreds of people and shooting the elephants with sleeping medicine and all that.

On the correct day, the elders in the village will do all the required *poojas* for the spirit. Then some selected men will go into the forests, to a particular area that the spirits tell us where to find the elephants. When they see the herd they go up to them and ask some elephants to come and join us to work for the Kings. Some particular elephants would separate out from the herd and give themselves up to be caught. On their own they would come out and enter the *kraal* for training (Thepakadu, September, 2009).

They pride themselves in not using the *ankush* or bull hook to control elephants, and talk about the mutual relationship between them and elephants, highlighted by story of Bhama, who chased away a leopard that attacked her *mahout*, and carried him back 3 km to the camp and saved him life, as he was critically injured and unconscious<sup>9</sup>.

Bettakurumbas’ abilities to communicate with and gain cooperation from wild elephants finds mention in the 1908 Gazetteer of the Nilgiris: “*Stories are told of how they can summon wild elephants at will*” (Francis, 1908, p. 156). This reflects their animistic ideas about elephants as coexistent other-than-human persons capable of mutual respect and cooperation.

### Paniyas

The Paniyas are the largest tribe in the region. The name translates into “worker” (Paniyan) in Malayalam, and records from as early as the 8th century CE suggest that the Paniyas were an enslaved community (Aiyappan, 1992). The traditional slavery evolved into a system of indentured labor under the Chettys, which appears to have persisted until 1976 (Kulirani, 2003).

Given this long history of subjugation and marginalization, there is confusion around their basic hunter-gatherer vs. settled-agriculture mode of subsistence, but the early literature records that “*women and children may be seen digging up jungle roots, or gathering pot-herbs for food*” (Thurston and Rangachari, 1909 Vol. 6:59). Their engagement with the modern cash economy remains similar to the traditional immediate returns (Woodburn,

<sup>6</sup>For this hunter-gatherer community a *pooja* is a ritual to connect and communicate with animistic spirits and other-than-human persons, where at times gifts of fruits or even alcohol are offered. This is distinct yet increasingly more influenced by the mainstream *pooja* in Hinduism, which is a worship ritual performed to offer devotional homage and prayer to deities.

<sup>7</sup>All quotes in this paper are from key informant discussions, with the place and date mentioned at each instance.

<sup>8</sup>A method of capturing elephants where an entire herd is driven into a specially constructed stockade or ‘*keddah*’, followed by *mahouts* entering the *keddah* on tame elephants and lassoing and separating out the elephants for individual training.

<sup>9</sup>News article: <http://www.thehindu.com/2000/01/23/stories/13231087.htm>.

1982) of the food gathering economy, where they see agricultural labor as a form of wage gathering which allows them to purchase food for their families in the immediate term rather to be banked individually (Kulirani, 2003).

Given this background, there are limited interactions with elephants compared to the Kattunayakans and Bettakurumbas, but within these interactions there is some degree of tolerance of elephants, as the following examples illustrate.

An old Paniya man had been killed by an elephant, while on the way back from a tea estate where he worked. In a discussion with his daughter:

“What can be done? Nothing can be done. He has gone. What can we say about the elephant? It was going one way on the road and he was coming the other way. He got killed. It did not come after him to kill him. Such things happen. If they give compensation good, otherwise what can be done? Nothing” (Gudalur, December, 2007).

This attitude—an acceptance coexistence with occasional conflict, particularly through accidental encounters with elephants—was relatively widespread among many of the communities. While this could be on account of an element of powerlessness in terms of the laws that prohibit killing elephants, there is no oral or written history of these indigenous communities killing elephants.

Many years later, in discussion with the same person about elephants in the region:

“Elephants are coming back everywhere! Growing up as a child we used to happily play around the village till late night. Even my grandparents don’t remember a time when there were elephants in our village. Now no one steps out after dark, almost every day there are elephants around. Even the dogs have to be kept inside the houses. Everyone is scared, it’s not like before... Nothing can be done. They said they will put a fence around the village, but it will break and elephants will come. We have to be careful now, that’s all” (Gudalur, March, 2016).

### Mullukurumbas

Unlike the other three communities, the Mullukurumbas are settled agriculturalists and the only tribal community in the region to have title for their land, granted in colonial times. They also consider themselves superior to some of the other tribal communities; “*Among the natives of the village, the Mullukurumbas are next to the Chettys socially and ritually, while the Urali Kurumbas [Bettakurumbas], Kattu Naickens and Paniyans follow in the descending order*” (Misra, 1971, p. 31). They are more integrated into mainstream society, and Misra notes that in 1971 it was already three or four decades since the forests around them had been changed to plantations, affording very limited interactions with wildlife (elephants). Still, we include them in this discussion, since elephant ranges are expanding, and more Mullukurumba villages are beginning to interact with elephants regularly. Also, a large number of the temporary field staff of the forest department, employed to chase elephants are from this tribe. One interesting interaction that highlights Mullukurumba’s beliefs about elephants:

“...On the way back we decided to come through Ayankolly road... When we reached Amko factory, there was Makana [wild, tuskless male elephant] standing. And two staff were there... they were talking to the Ganesan elephant telling him to go into the forests quietly and not to stand in the middle of town, otherwise lots of people will come and it will be a big problem for him. Subramani ettan told me that this animal can understand whatever we speak to him” (Cherambadi, 10<sup>th</sup> May, 2016).

This practice reflects the notion of appealing to the elephant as a manifestation of the Hindu god Ganesh in order to maintain peaceful coexistence.

### Chettys

“Chettys” (also spelt Chettis) are a well-known merchant community across South India, but the Chettys of the Nilgiris are not connected to this larger community, and very little has been written about them in colonial literature. Bird-David says they “*probably gradually emigrated from surrounding areas throughout preceding centuries and encroached on land in the Nilgiri-Wynaad*” (1994:341), but for most local people, the Chettys are considered indigenous, with no marked point of immigration into the region. They have long been settled-agriculturalists, traditionally growing a range of millets and grains, but now focused on paddy cultivation in low lying areas (Krishnan, 2009) and a range of cash crop vegetables. Although they have lived and continue to live in close proximity to the forests, they do not have a history of dependence on forest produce.

An emblematic response to how they see the future with elephants in the region is as follows:

“Growing paddy is very difficult. We have always had problems with elephants. In the old days there was no other choice, we needed the rice to eat. We had various bell systems to warn us when elephants came. Then we would all get together and beat drums and chase them away. Now people can’t take that much trouble. If the elephants come and start eating the paddy no one comes to help. Children will not want this hard lifestyle. Once they go to school and college they will not come back to this. They will get good jobs and move to other places.”

“In the long term we will have to do something about elephants. Once my son grows up he may want to buy a motorbike. Then we will need a road here and that won’t be good for the animals. And it’s dangerous as well, people on bikes get killed by elephants quite often we hear” (Muduguli, June, 2009).

Of the 1000 or so Chetty families currently in the region, over 600 families live within what is now the Mudumalai Tiger Reserve, and have been fighting to be relocated out of the forests since the 1980’s, even getting the High Court to instruct the Government to relocate them. From the quote above, it is evident that they do not see a future linked to agriculture, particularly when it is further strained by wild animals feeding on their crops. Coexistence in their case may mean adapting to other modes of subsistence and conflict avoidance. With their long shared history of living with elephants they are not particularly antagonistic toward elephants and believe negative interactions are inevitable, but at the same time do not appear to have significant animistic

beliefs or interactions with individual elephants as other-than-human persons that may have especially facilitated tolerance and coexistence in the past.

### Early Planters

The five ethnic communities described above now form less than about 20% of the population, with various waves of migration over the years. The first migration of early planters began in the mid-1800's, and carried on till the mid-1900's. This stakeholder group does not constitute a single ethno-linguistic group, with their only common factor being the fact that they were the first immigrants into the region, and are further divided by class—small estate owners or local elites and estate workers. The local elites form a peer group in the Nilgiris and interact regularly through social clubs, where English is the common language of communication.

Despite wielding significant power locally, the unstable nature of global commodities like tea and coffee has produced for them a fragile and ambiguous financial status. The majority of the younger generation is moving out of the region to urban centers in India and other parts of the world, with their family estates turning largely into holiday homes. Given that elephants do not eat tea or coffee, there is no immediate threat posed by elephants to this group and their livelihood. Their relative affluence rarely puts them into direct and life-threatening contact with elephants, making them more tolerant to the animals on their land:

"I keep our gate locked during the day to keep unwanted people out. But I leave it open at night, to allow the elephants to move in and out, without having to knock the gate down!. The herd comes right up to the veranda. Last week, there were seven of them, they ate up all the flowers, but didn't do any other damage. They are actually very peaceful animals if you don't trouble them"- (a small estate owner, January 2011).

"We do have considerable damage from elephants on the whole, but actually we are quite proud of it. Whenever relatives and friends come over, we walk them through our estate and show them all the signs of where the elephants have been and what they have done. It's all part of this estate life"- (another small estate owner, January 2011).

While they do not appear to hold animistic beliefs about elephants, there is some idea of individuality and an attempt to rationalize bad behavior by particular elephants:

"It was horrible... They just completely destroyed everything. ... Really rowdy elephants, we have never seen anything like this in the last 30 years. We are convinced they came from Kerala. Just the same as all these young rowdy tourist boys now come on motorcycles you know" (Silver Springs Estate, February 2016).

In this first wave of migration into the region, there are also workers on these same estates. Our interactions with these groups of people are somewhat limited, since the majority of them live in labor lines<sup>10</sup>, situated inside privately owned estates without public access. They are clearly much more exposed and thus

vulnerable to being in dangerous situations with elephants. Yet, overall, their attitude and perception of elephants is similar.

...elephants have always been here, but now both the elephants and the people are increasing. Before we used to not see them much, they used to come and go in the night once in a way, but now we see elephants almost every other day. But what to do? We can't chase them anywhere. This is also the elephant's home. Neither us nor them can go back to our native places. This is our home now" (Kapikadu Village, February 2016).

There is a sense that elephant numbers and range are increasing and there is likely to be more conflict in years to come. But there is also a sense of inevitability and tolerance—neither the elephants nor the people can be displaced from the region, and there is no option but to try and coexist peacefully.

### Malayalis

The Malayali settlers from the neighboring state of Kerala are perhaps now socially and politically the most vociferous community in the region, occupying most of the elected positions in the local self-government. There has historically been significant conflict between the Malayalis and the indigenous communities, primarily over land; *"The Christian immigrants here are keen to possess land in and around the village. Hence they liberally lend money to the native population if the latter mortgages their land"* (Misra, 1971, p. 32). An NGO in the region also highlights this: *"ACCORD (Action for Community Organization, Rehabilitation and Development) was born in November 1985 out of the realization that the Adivasis of the Gudalur Valley were being cheated and exploited... We started with the central belief that Adivasis had to retrieve the ancestral lands taken away from them by force and deceit"*<sup>11</sup>.

Having little traditional experience with forests or wildlife, or a tradition of sharing space with elephants, they find it hard to deal with elephants:

"We urgently need better protection from the elephants. The forest department is not doing anything to help us. A poor family invests all their savings, taking loans against their gold to plant a few acres of bananas, and in just one night their whole life is destroyed by elephants. We don't even get compensation from the Government since we don't have patta<sup>12</sup> for the land. We have had many protests demanding that proper trenches and electric fences are built to keep the elephants inside the forests, but no one is listening."

"Elephant are routinely coming into all the areas in our *panchayat* (local self-government), even near the town. We have sent petitions to the Collector, Mudumalai Field Director and all officials. Still no action is taken. So last month we organized a protest outside our *panchayat* office, with full participation from all the local people..." (Local Government Meetings, Gudalur, June 2013).

<sup>11</sup><http://adivasi.net/history.php>.

<sup>12</sup>Patta refers to a legal title deed for the land. Many of the immigrants do not have this, with contested land rights being a key part of the problem.

<sup>10</sup>Terraced dwellings constructed for plantations workers.



Overall, this community has the most trouble living with elephants, and they are perhaps the only ethnic community which, on the whole, does not see sharing space with elephants as a viable option now or in the future.

### Sri Lankan Tamils

The Sri Lankan Tamil repatriates are the final migrant community to enter the region, and were subjected to the largest organized yet turbulent migrations in the 20<sup>th</sup> century. The Colonial era companies took a large number of Tamilian laborers from India to Northern Sri Lanka in the late 19<sup>th</sup> and early 20<sup>th</sup> centuries to work on tea plantations, but at the time of Sri Lankan independence these communities, then at about 500 thousand people, were denied citizenship. After numerous diplomatic discussions they were allowed to come back, and about 250,000 people were moved to India between 1967 and 1987 (Bass, 2013)<sup>13</sup>. The majority of the repatriates who stayed in India were settled in the Nilgiris, where the Government converted large tracts of forests into tea plantations to employ them, with a number of them subsequently squatting on government land.

Given that historically they had little or no interaction with elephants, Sri Lankan Tamils find it particularly hard to cope, and also get no compensation from the state for losses in elephant encounters, as they do not possess title for their land. As one pleaded:

“You have to help us somehow. We live in constant fear. Elephants never used to be here before, but in the last few years they are always here. They come at night and break down houses. We can’t go out to the toilet in the morning without fearing for our lives. We can’t come back to our houses from the bus stand if it gets later than six in the evening. More and more people are getting killed every year. Either the government should give us land somewhere else or they should chase all these elephants back to Mudumalai”- (O’Valley region, October 2013).

While this fear of elephant was the dominant sentiment, a most positive sentiment also was articulated: “...I have been here for over 30 years—more than most of the other people. Things have changed a lot and the problems have increased. The number of people has increased a lot, and the elephants are not afraid as much now, and boldly walk on roads, drink water from the panchyat tanks etc... Elephants have always been here, and they will always be here. People will learn to adjust. This chasing them into Mudumalai is foolish, everyone knows it cannot be done” (O’Valley region, October 2013).

The majority of this Tamil community is also Hindu, worshipping Ganesha, the elephant headed deity, and as one informant noted, damage by elephants is understood in terms of divine retribution:

“The people must have done something wrong in their lives and God is punishing them. There is no other explanation” (Deivamalai Village, January 2016).

<sup>13</sup>The conflict peaked around 1980, with a brutal anti Tamil pogroms in Sri Lanka where thousands of Tamils were killed, leading to a war that lasted decades with about 70,000 people killed over the years - [http://news.bbc.co.uk/1/hi/world/south\\_asia/7521197.stm](http://news.bbc.co.uk/1/hi/world/south_asia/7521197.stm).

## DISCUSSION: CATEGORIZING THE HUMAN DIVERSITY

The quantitative analysis points to the cultural variable of ethnic community as the key predictor of tolerance. While generalizing about an entire community’s interactions with elephants is arguably problematic, from a policy or management perspective, some generalization or grouping is inevitable, and we argue that ethnic community is the most meaningful way of doing this. From the qualitative methods, we have outlined each ethnic community’s history in relation to the landscape, their current occupations and modes of subsistence, and finally to elephants themselves in terms of knowledge, beliefs, and practices.

From this analysis, there are three main cultural-ecological variables that correlate with enabling tolerance and the sharing of space with elephants for a more peaceful coexistence: (1) Elephant ontologies, or what each community thinks an elephant is within their collective lifeworld, (2) a community’s specific modes of subsistence and agricultural crops, and (3) the shared ethnic history of living with elephants. The diversity that arises amongst these three dimensions in combination is more difficult to classify or cluster neatly, and any simplistic grouping of peoples is fraught with generalization, essentialization, and subjectivity. Nevertheless the correlations are significant, and our analysis below suggests these underlying cultural-ecological factors coalesce in a tolerance that enables people and elephants to coexist more peacefully. Therefore, it may be a useful heuristic approach to understanding the unity and diversity of human-elephant interactions in the region, if not more widely (Thekaekara and Thornton, 2016). It is important to note that these results represent a temporal snapshot of beliefs and perceptions, and attitudes toward coexistence with elephants may change with on-going interactions and demographic conditions among and between different ethnic communities or stakeholder groups and elephants over time. Some individuals may also oscillate between positive and negative perceptions about elephants (Thekaekara, 2018).

### Ontology—What Is an Elephant

First, concerning the characterization of elephants, or the varied elephant ontologies - how are they conceived and their interactions with people explained? There appear to be four broad conceptualizations that emerge, where people understand elephants as (1) Other-than-human persons, (2) Gods, (3) Victims, and (4) Wild/unpredictable animals, which we briefly describe below.

First is the indigenous idea of other-than-human persons, where some individual elephants are accorded some form of person-hood, capable of mutual respect, communication and even relationships with humans, that was prevalent among the Kattunayakans, Bettakurumbas and to a lesser extent the Paniyas. This conceptualization of elephants allows for accepting varying behavior in elephants based on individuality, personality and agency. Elephants are expected to behave in accordance with human values and morality, and elephants that have been wronged are expected to be angry or sad and behave unpredictably (where even killing of a person is not seen

as unusual), but aberrant individuals who behave badly with no (perceived) provocation are liable for punishment. This understanding of elephants is perhaps the most conducive to sharing of space for a more peaceful coexistence.

Second is the idea of elephants as Ganesha or Ganapati, one of the best known and most worshiped deities of the Hindu pantheon, which is prevalent among all the communities except the hunter-gatherers, Christian or Muslim Malayalis, and Forest Department/Wildlife NGOs. Attributing divine status to elephants almost automatically implies certain reverence and tolerance. Negative encounters between people and elephants are rationalized in terms of divine retribution, and there is a certain acceptance of that moral ecology. While this appears to be ideal for tolerance and a sharing of space, we rank it below the other-than-human idea of elephants, as this divine reverence does not allow for individuality in elephants. Even with continuous exposure to violence from elephants, there is no room to adjudicate these negative interactions, and assign responsibility to both humans and elephants, since the latter is considered divine. This can lead to a complete breakdown in the human-elephant relationship, and elephants can then quickly become demons. While we did not encounter direct references to this in our fieldwork, we did find a deep antagonism toward elephants in some people, particularly the Sri Lankan Tamils, despite their worship of elephants. This duality exists in Hindu mythology; Gajasura is the elephant demon, and Gajasurasamhara, an avatar of Shiva, is the “slayer of the elephant demon,” who appears in Pallava and Chola art and iconography from over a thousand years ago, portrayed dancing on an elephant’s head (Peterson, 1991).

The third is the idea of elephants being victims. This is very prevalent among the Wildlife People group in particular—i.e., the notion that humans are expanding into and destroying elephant habitat, and forcing them into contact with people. The Kattunayakans also share this view to a lesser degree, where they see both themselves and elephants losing out on account of the large migration of people into the region. With this approach there is again limited scope to accommodate individuality, personality or agency in elephants. The underlying assumption is that elephants are passive victims not in control of their circumstances, who interact with people only because they have been forced to do so. This idea is arguably the basis of the global narrative around conservation, but, ironically, it is not shared by most of the communities living with elephants. In fact, while there has been a significant reduction of natural cover over the last century, with immigration and growing human population into the region, elephants also have been expanding their range over the last few decades (MoEFCC, 2017).

And finally, is the idea of elephants as wild and unpredictable animals. This stems from an anthropocentric view of the world, arguably rooted in the Judeo-Christian ideology where man was created in the image of God, to “rule over the fish in the sea and the birds in the sky, over the livestock and all the wild animals, and over all the creatures that move along the ground” (Genesis, 1975 1:26). White (1967) argued that this ideology of dominion was a root cause of the current ecological crisis. This could also be rooted in a more secular utilitarian or materialist

worldview, where much of the natural world is seen as a resource base. This orientation does not allow for elephants (or any species) and humans to be ontological equals, and typically (St. Francis notwithstanding) there is no moral obligation to behave well or coexist tolerantly with animals, and killing elephants is acceptable. A version of this also exists in biology, where “unruly” animal behavior is explained more in terms of instinct and stimulus from their immediate environment rather than more contingent, complex processes of culturally-mediated experience and cognition (Masson and McCarthy, 1996).

How these views manifest across different communities is shown in **Table 4**. It is evident that many of the communities ascribe to multiple conceptualizations of the elephant. While all of these different ideas around “what is an elephant?” are important, from the perspective of sharing space with elephants the most relevant is the hunter-gatherer’s other-than-human ontology of elephants, which allows for significant mutual accommodation and variation in the behavior of both elephants (as non-human persons) and people. This worldview makes them the most tolerant, both from the quantitative regression model and from the qualitative analysis of interactions with elephants.

## Modes of Subsistence or Agricultural Crop Types

Another important factor that mediates human elephant interaction and coexistence is the type of land use and this is very relevant in shared spaces where the people are hunter-gatherers, small scale agriculturalists, agricultural laborers, plantation owners, to traders or small business owners, with agriculture also varying between food crops like rice, bananas or vegetables which elephants eat, and plantations crops like tea and coffee which elephants do not eat. From the “competition over space and resources” (Pimm et al., 1995) understanding of HEC, it would appear that conflict could be grouped into three distinct categories with decreasing intensity of conflict with elephants – (1) No crops, (2) inedible (for elephants) crops, and (3) edible crops. Not interacting with elephants at all would imply no conflict at all, but all the communities in the region do interact with elephants in some ways.

No crops - the Wildlife People, most of the Sri Lankan Tamils, laborers from the early planters, the Paniyas and some of the Kattunayakans and Bettakurumbas, all do not own significant areas of land or grow any crops themselves. This may minimize their negative interactions with elephants and engender less negative attitudes about sharing space.

Inedible crops - the early planter who grew tea and coffee, which elephants do not consume and may therefore not facilitate significant negative interactions between elephants and people. Some of the Kattunayakans, Bettakurumbas, and Mullukurumbas who have land have taken to planting tea and coffee over the last decade, partly as a means of proving their possession over the land they occupied. While the Mullukurumbas have traditionally planted rice and bananas, since they do not significantly overlap with elephants, the Kattunayakans and Bettakurumbas almost never planted bananas, even though they are more remunerative than tea or



**TABLE 4 |** Varied beliefs about elephants.

Ethnic/stakeholder groups	Other-than-human Persons	Gods	Victims	Wild animals
Forest Department/Conservation NGOs				
Kattunayakans				
Bettakurumbas				
Paniyas				
Mullukurumbas				
Chettys				
Early Planters				
Malayalis				
Sri Lankan Tamils				

Shaded area indicated "yes" and unshaded area indicates "no".

coffee. When queried about why they did not grow bananas, the answer from a Kattunayakan was *"because elephants will eat it of course."* And as described above, a Bettakurumba elder also voices his concern about some of the other communities planting bananas and the increased risk it poses in attracting elephants to the human settlements.

Edible crops - the Mullukurumbas and Chettys have traditionally always planted rice, and the Malayalis often grow bananas – the crops that elephant do eat, and arguably pose a significant challenge from the perspective of sharing space.

Although we have been critical of the ecological competition within human-elephant modes of subsistence being the sole framework for understanding conflict between elephants and people, it cannot be entirely ignored as an ultimate parameter to sharing space. Different communities' subsistence adaptations is shown in **Table 5**.

Again there is significant diversity, with multiple communities engaged in more than one mode of subsistence. But the most relevant aspect is that on the whole only significant high conflict crops are planted by the Malayalis, since the Mullukurumbas do not significantly overlap with elephants and the Chettys are very small in number and also increasingly less disposed toward agriculture for the livelihood.

## Shared History

Finally, the shared history between elephants and people is an important factor in understanding tolerance. Living with elephants inevitably poses some challenges, and a shared history is a key element in allowing a culture of mutual accommodation to evolve. Communities like the Chettys, for example, who grow paddy and have a long history of guarding their crops from elephants, are less antagonistic toward elephants than the Malayali immigrants. Categorizing this shared history is challenging, since even among the indigenous communities there is some debate about when they first moved into the region. For this thesis, the most appropriate classification is (1) indigenous communities who have been in the region for at least a few 100 years and are the best adapted to elephants, namely the Kattunayakans, Bettakurumbas, Paniyas, Mullukurumbas and Chettys, (2) communities who have been in the region for close to a century – the early planters who came into the region in the first

wave of immigrations in the late 1800's and early 1900's and have now forged a relationship with elephants, and (3) communities who moved in about 50 years ago or less, specifically the Malayalis in the 1960's and the Sri Lankan Tamils in the 1970's and 80's, who have had significantly less time to adapt to elephants.

These different conceptual and explanatory frames vary significantly among the different communities inhabiting the Nilgiris, as summarized in **Table 6**.

Being able to share space for a more peaceful coexistence with elephants clearly hinges on the shared history, and how long the people have lived with elephants is important for evolving cultural and geographic conflict mitigation techniques, including interspecific communication and mutual accommodation and coadaptation for coexistence. This varies significantly among the different communities in the region. Significantly, even the most recent immigrant communities have been in place for over 30 years and, with new generations growing up on the land, are showing signs of adaptive coexistence with elephants (as in the case of some Sri Lankan Tamils or Early Planters).

In summary, these three underlying cultural-ecological factors seem to provide an enabling environment for tolerance of elephants and the ability to coexist peacefully. While all of these factors vary significantly between the different communities, tolerance does not vary linearly with each of them. That is, communities who plant elephant-conflicting crops are sometimes more tolerant than others who do not engage in agriculture, and communities who have had a longer exposure to elephants are sometimes less tolerant than those with a shorter exposure to elephants. But from a management perspective some generalizations are required, and given the monolithic understanding of the human in HWC policy around HEC, these three factors are arguably a reasonable way of heuristically understanding and accounting for the varying propensity of people to coexist peacefully space with elephants.

## CONCLUSIONS

We have shown in response to the question *"How are people differently tolerant to elephants around them, and what are the underlying cultural factors that affect this tolerance and facilitate coexistence?"* that ethnic community is the most critical

**TABLE 5 |** Varying agricultural practices.

Ethnic/stakeholder groups	No agriculture	Inedible crops	Edible crops
Forest Department/Conservation NGOs			
Kattunayakans			
Bettakurumbas			
Paniyas			
Mullukurumbas			
Chettys			
Early Planters			
Malayalis			
Sri Lankan Tamils			

Shaded area indicated "yes" and unshaded area indicates "no".

**TABLE 6 |** Varying history of living with elephants.

Ethnic/stakeholder groups	Indigenous	c. 100 years	c. 50 years or less
Forest Department/Conservation NGOs			
Kattunayakans			
Bettakurumbas			
Paniyas			
Mullukurumbas			
Chettys			
Early Planters			
Malayalis			
Sri Lankan Tamils			

Shaded area indicated "yes" and unshaded area indicates "no".

variable for predicting and understanding this diversity. We analyzed each ethnic community's varied history in the Nilgiris and interactions with elephants, and then identified three underlying factors that seem to play a key role in enabling more peaceful human-elephant coexistence. In conclusion, we assess the implications of this diversity for policy and management of the shared space to promote successful coexistence by reducing HEC and the negative impacts elephants and people have on each other.

Unfortunately, currently no government policies relating to human-elephant interactions recognize that there is considerable variation in how different human communities understand elephants, and the assumption that all people perceive and are impacted by elephants in the same way has proven problematic to promoting coexistence. Factoring culture and diversity into policy is a significant challenge; labeling entire communities with certain tags of tolerance or intolerance can result in essentialisms – failing to account for individual variation that always exists, or for temporality and contingency of cultural change of over time. Nevertheless, we have demonstrated an analytical approach that yields practical insights for apprehending the roots diversity in human-elephant relations which, in turn, can feed meaningfully into policy formulation and the reduction of HEC specifically, and HWC more generally. Three insights are paramount in terms of their implications for policy.

First, not all interactions between elephants and people are negative. The traditional idea that conflict "occurs wherever these

two species coincide" (Sitati et al., 2003, p. 667), is clearly not accurate, and recent literature (Inskip et al., 2016; Kansky et al., 2016) is beginning to take account of the diversity in human-animal relations. Still, the cultural nuances informing human elephant interactions are not captured in the frameworks of the natural sciences. Positive interactions between elephants and people are ignored, and there is a fascination with elephants that draws people to them even in cases of conflict which is not accounted for in the literature. In some cases, there is the entertainment and "fun" in people having a night out chasing the elephants together, but in other cases they are also just content to watch the elephants for extended periods of time. For tourists seeking wildlife experiences this is of course understandable and expected and there are even attempts to look at how much they will be willing to pay to offset the damage done by elephants (Bandara and Tisdell, 2003, 2004). Yet, we find even people who interact with wild elephants on an almost daily basis, often negatively, are still willing to invest their time (an opportunity cost) in fascinatedly watching elephants so as to learn more about them, if not as a demonstrable act of tolerance and coexistence. Tea estate workers and supervisors stop working for a while and invariably call their managers to come and join them. What to do about the elephants is almost secondary, the first reaction is usually to simply stop and watch them. We routinely come across people who complain bitterly about elephants and the damage they cause, who could be classified as highly intolerant. Yet, they are more than willing to spend an hour or two watching

elephants with us, constantly discussing the elephants' activities, individual proclivities (including tolerance), and the specific interactions each has had with local people in this human-dominated landscape. The positive experiences and knowledge people gain from elephants is almost never quantified or even recognized in studies on HEC. Yet such engagements form the basis of continuous learning, coadaptation, and the negotiation of peaceful coexistence.

Second, indigenous communities, and hunter-gatherers in particular, often have a very different perspective on non-human species, and their relationship with particular other-than-human elephants is very useful in allowing them to coexist with elephants more peacefully. And given the “*remarkable consistency of animism across the world*” among hunter-gatherer communities (Praet, 2013, p. 341) and wide attestations regarding the non-human personhood status (Nelson, 1995) of animals among forest-based people who share space with them, it may be a widespread cognitive adaptation to consider them not as incompatible with human existence, but rather part of the community of beings. This idea of personhood extends to the individual too. The Kattunayakans understanding of “idiosyncratic personalities” that Naveh and Bird-David (2014) describe is very similar to what modern ethologists have discovered through careful elephant behavioral studies (Lee and Moss, 2012; Srinivasaiah et al., 2012). Perhaps linked to this is the fact that people who have been living with elephants for some time also seem to have more nuanced ideas of personality and culture in elephants, where they distinguish between good and friendly elephants and bad or rowdy elephants. This is compatible with hunter-gatherers' other-than-human persons perspective, but accepting that in a community of beings some individuals may behave badly and must therefore be punished or excluded in order to maintain peaceful coexistence between the human and elephant communities. This view has important conservation implications, and the idea of elephants as non-human persons has had impacts on conservation policies in other regions (Derham and Mathews, 2020), where the behavior of individual elephants is assessed beyond the wider conservation goal of saving the species (Wallach et al., 2020).

Third, the dominant view on HWC may not always be the majority one. In Gudalur, most of the *panchayat* positions are occupied by Malayalis, who have the most trouble in sharing space with elephants. As a consequence, the dominant narrative in local policy circles assumes that the high level of conflict and antagonism between people and elephants is common to all the inhabitants of the region, but this is clearly not the case. Yet, if this is taken as a given, any superficial investigation into the question of HEC will inevitably play out as a self-fulfilling prophecy. It is only through a deeper ethnographic engagement and comparative analysis of constituent communities that a more nuanced picture emerges of the significant differences in how people interact with elephants.

A key implication of these findings is that conflict mitigation strategies must seriously consider this diversity in how humans interact with elephants before they are implemented

universally across communities. Strategies informed by best-practice examples of tolerance will be key to promoting peaceful coexistence between people and elephants. Simplistic barriers aimed at separating out spaces or implementing singular deterrents may in fact have negative consequences in the long term, making people less willing to share space. Broad overly simplistic assumptions about tolerance by reducing it merely to ideas of ethnicity or indigeneity will be problematic since it is unable to capture changes in attitudes over time and difference in individuals' behaviors toward elephants. Understanding cultural differences and variability over time is vital in order to come up with nuanced community and place-based solutions that work to promote peaceful coexistence between people and elephants. Redesigning the way policy is formulated, moving it away from the top-down, expert driven approach, to more bottom-up and community-driven strategies will be essential. If every village is encouraged and allowed to make their own plans for sharing space with elephants, with access to the range of available solutions, it will provide impetus for more community-based, culturally-relevant and resilient human-wildlife coexistence.

## DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

## ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Open University Human Research Ethics Committee. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

## AUTHOR CONTRIBUTIONS

Study design was by TThe, SB, and TTho as a part of the first author's PhD thesis. Fieldwork, data collection, and analysis were performed by TThe. The manuscript was written by TThe, SB, and TTho. All authors read and approved the final manuscript.

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## REFERENCES

- Aiyappan, A. (1992). *The Paniyas, an Ex-Slave Tribe of South India*. Calcutta: Institute of Social Research and Applied Anthropology.
- Anderson, P. N. (2001). Community-based conservation and social change amongst South Indian honey-hunters: an anthropological perspective. *Oryx* 35, 81–83. doi: 10.1017/S0030605300031562
- Babu, S., and Thekaekara, T. (2013). A crowd-sourced approach for monitoring asian elephants outside protected areas. *Proc. IEEE* 2013, 376–379. doi: 10.1109/GHTC.2013.6713715
- Bandara, R., and Tisdell, C. (2003). Comparison of rural and urban attitudes to the conservation of asian elephants in Sri Lanka: empirical evidence. *Biol. Conserv.* 110, 327–342. doi: 10.1016/S0006-3207(02)00241-0
- Bandara, R., and Tisdell, C. (2004). The net benefit of saving the asian elephant: a policy and contingent valuation study. *Ecol. Econ.* 48, 93–107. doi: 10.1016/j.ecolecon.2003.01.001
- Baskaran, N., Anbarasan, U., and Agoramoorthy, G. (2012). Indias biodiversity hotspot under anthropogenic pressure: a case study of Nilgiri biosphere reserve. *J. Nat. Conserv.* 20, 56–61. doi: 10.1016/j.jnc.2011.08.004
- Bass, D. (2013). *Everyday Ethnicity in Sri Lanka: Up-Country Tamil Identity Politics*. Routledge: Routledge Contemporary South Asia Series. doi: 10.4324/9780203097809
- Bird-David, N. (1990). The giving environment: another perspective on the economic system of gatherer-hunters. *Curr. Anthropol.* 31:189. doi: 10.1086/203825
- Bird-David, N. (1992). Beyond the hunting and gathering mode of subsistence: culture-sensitive observations on the nayaka and other modern hunter-gatherers. *Man* 27:19. doi: 10.2307/2803593
- Bird-David, N. (1996). Puja or sharing with the gods?: On ritualized possession among Nayaka of South India. *East. Anthropol.* 49, 259–276.
- Bird-David, N. (1999). “Animism” revisited: personhood, environment, and relational epistemology 1. *Curr. Anthropol.* 40, S67–S91. doi: 10.1086/200061
- Bird-David, N. (2006). Animistic epistemology: why do some hunter-gatherers not depict animals? *Ethnos* 71, 33–50. doi: 10.1080/00141840600603152
- Bird-David, N., and Naveh, D. (2008). Relational epistemology, immediacy, and conservation: or, what do the nayaka try to conserve? *J. Study Relig. Nat. Cult.* 2:55. doi: 10.1558/jsrnc.v2i1.55
- Costello, A. B., and Osborne, J. W. (2005). Best practices in exploratory factor analysis: four recommendations for getting the most from your analysis. *Pract. Assess. Res. Eval.* 10:1. doi: 10.7275/jyj1-4868
- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika* 16:297. doi: 10.1007/BF02310555
- Derham, T., and Mathews, F. (2020). Elephants as refugees. *People Nat.* 2, 103–110. doi: 10.1002/pan3.10070
- Dickman, A. J. (2010). Complexities of conflict: the importance of considering social factors for effectively resolving human-wildlife conflict. *Anim. Conserv.* 13, 458–466. doi: 10.1111/j.1469-1795.2010.00368.x
- Douglas-Hamilton, I., Krink, T., and Vollrath, F. (2005). Movements and corridors of African elephants in relation to protected areas. *Naturwissenschaften* 92, 158–163. doi: 10.1007/s00114-004-0606-9
- Francis, W. (1908). *Madras District Gazetteers: The Nilgiris*. Superintendent, Government Press.
- Gangaas, K. E., Kaltenborn, B. P., and Andreassen, H. P. (2015). Environmental attitudes associated with large-scale cultural differences, not local environmental conflicts. *Environ. Conserv.* 42, 41–50. doi: 10.1017/S0376892914000125
- Genesis (1975). *The Bible. New King James Version*. Thomas Nelson Publishers.
- Green, S. B., Lissitz, R. W., and Mulaik, S. A. (1977). Limitations of coefficient alpha as an index of test unidimensionality. *Educ. Psychol. Meas.* 37, 827–838. doi: 10.1177/001316447703700403
- Grenier, L. (1998). *Working With Indigenous Knowledge: A Guide for Researchers*. Ottawa, ON: International Development Research Centre.
- Hallowell, A. (1960). “Ojibwa ontology, behavior, and world view,” in *Culture and History: Essays in Honor of Paul Radin*, ed S. Diamond (New York: Columbia University Press) pp. 19–52.
- Hammersley, M., and Atkinson, P. (2007). *Ethnography: Principles in Practice*. London: Routledge. doi: 10.4324/9780203944769
- Hazzah, L., Mulder, M. B., and Frank, L. (2009). Lions and warriors: social factors underlying declining African lion populations and the effect of incentive-based management in Kenya. *Biol. Conserv.* 142, 2428–2437. doi: 10.1016/j.biocon.2009.06.006
- Hockings, P. (2008). All aboard the nilgiri express!-sustained links between anthropology and a single Indian District. *Hist. Anthropol. Chur.* 19, 1–16. doi: 10.1080/02757200802150869
- Ingold, T. (2000). *From Trust to Domination – An Alternative History of Human-Animal Relations. In The Perception of the Environment: Essays on Livelihood, Dwelling and Skill*. London: Routledge.
- Inskip, C., Carter, N., Riley, S., Roberts, T., and MacMillan, D. (2016). Toward human-carnivore coexistence: understanding tolerance for tigers in Bangladesh. *PLoS ONE* 11:e0145913. doi: 10.1371/journal.pone.0145913
- Jayaraman, K. (2009). Indian neutrino lab site rejected. *Nature* 462:397. doi: 10.1038/462397b
- Johnsingh, A. J. T., Raghunath, R., and Madhusudhan, M.D. (2008). *Suggested Extension for the Mudumalai Tiger Reserve, a Unique Tiger Landscape in India*. Mysore: Nature Conservation Foundation.
- Jonas, H. D., Barbuto, V., Jonas, H. C., Kothari, A., and Nelson, F. (2014). New steps of change: looking beyond protected areas to consider other effective area-based conservation measures. *Parks* 20, 111–128. doi: 10.2305/IUCN.CH.2014.PARKS-20-2.HDJ.en
- Kansky, R., Kidd, M., and Knight, A. T. (2016). A wildlife tolerance model and case study for understanding human wildlife conflicts. *Biol. Conserv.* 201, 137–145. doi: 10.1016/j.biocon.2016.07.002
- Kansky, R., and Knight, A. T. (2014). Key factors driving attitudes towards large mammals in conflict with humans. *Biol. Conserv.* 179, 93–105. doi: 10.1016/j.biocon.2014.09.008
- Karlsson, B. G. (2003). Anthropology and the “indigenous slot” claims to and debates about indigenous peoples status in India. *Crit. Anthropol.* 23, 403–423. doi: 10.1177/0308275X03234003
- Kempton, W., Boster, J. S., and Hartley, J. A. (1996). *Environmental Values in American culture*. Cambridge, MA: MIT Press.
- Knight, J. (2000). *Natural Enemies: People-Wildlife Conflicts in Anthropological Perspective*. European Association of Social Anthropologists. Abingdon: Taylor & Francis.
- Krishnakumar, R. (2018). *Why Kerala is Hell-Bent on Revoking Night Traffic Ban*. *Deccan Herald*. Available online at: <https://www.deccanherald.com/specials/insight/why-kerala-is-hell-bent-on-revoking-night-traffic-ban-688240.html> (accessed March 18, 2021).
- Krishnan, S. (2009). Of land, legislation and litigation: forest leases, agrarian reform, legal ambiguity and landscape anomaly in the Nilgiris, 1969–2007. *Conserv. Soc.* 7:283. doi: 10.4103/0972-4923.65174
- Kulirani, F. (2003). “The shrinking livelihood strategies of the paniyar,” in *Conference Report of the Interdisciplinary Conference at the Centre for Indian Studies. Livelihood Strategies Among Forest-Related Tribal Groups of South India: Contextual Analysis of Local Livelihood Strategies* (Mysore).
- Lee, P. C., and Moss, C. J. (2012). Wild female african elephants (*loxodonta africana*) exhibit personality traits of leadership and social integration. *J. Comp. Psychol.* 126:224. doi: 10.1037/a0026566
- Locke, P. (2013). Explorations in ethnoelephantology: Social, historical, and ecological intersections between Asian elephants and humans. *Environ. Soc.* 4, 79–97. doi: 10.3167/ares.2013.040106
- Locke, P. (2017). Elephants as persons, affective apprenticeship, and fieldwork with nonhuman informants in Nepal. *HAU J. Ethnograph. Theory* 7, 353–376. doi: 10.14318/hau7.1.024
- Lute, M. L., Navarrete, C. D., Nelson, M. P., and Gore, M. L. (2016). Moral dimensions of human-wildlife conflict. *Conserv. Biol.* 30, 1200–1211. doi: 10.1111/cobi.12731
- Manfredo, M. J., and Dayer, A. A. (2004). Concepts for exploring the social aspects of human-wildlife conflict in a global context. *Hum. Dimen. Wildlife* 9, 1–20. doi: 10.1080/10871200490505765
- Mann, H. B., and Whitney, D. R. (1947). On a test of whether one of two random variables is stochastically larger than the other. *Ann. Mathemat. Statist.* 18:50. doi: 10.1214/aoms/1177730491
- Masson, J. M., and McCarthy, S. (1996). “When Elephants Weep: The Emotional Lives of Animals”. London: Delta.



- Mathur, P. K., and Sinha, P. R. (2008). Looking beyond protected area networks: a paradigm shift in approach for biodiversity conservation. *Int. Forest. Rev.* 10, 305–314. doi: 10.1505/1for.10.2.305
- Misra, R. (1971). *Mullukurumbas of Kappala*. Mysore: Anthropological Survey of India, Government of India.
- MoEFCC (2017). *Synchronised Elephant Population Estimation India - 2017. Project Elephant Division, Ministry of Environment, Forests and Climate Change*. New Delhi: Government of India.
- Moola, F., and Roth, R. (2019). Moving beyond colonial conservation models: indigenous protected and conserved areas offer hope for biodiversity and advancing reconciliation in the Canadian Boreal Forest. *Environ. Rev.* 27, 200–201. doi: 10.1139/er-2018-0091
- Myers, N., Mittermeier, R. A., Mittermeier, C. G., Da Fonseca, G. A. B., and Kent, J. (2000). Biodiversity hotspots for conservation priorities. *Nature* 403, 853–858. doi: 10.1038/35002501
- Naveh, D., and Bird-David, N. (2014). How persons become things: economic and epistemological changes among nayaka hunter-gatherers. *J. R. Anthropol. Institute* 20, 74–92. doi: 10.1111/1467-9655.12080
- Nelson, R. K. (1995). “Searching for the lost arrow: Physical and spiritual ecology,” in *The Biophilia Hypothesis*, eds S. Kellert and E.O. Wilson (Washington, DC: Island Press).
- Peterson, I. V. (1991). *Poems to Siva: The Hymns of the Tamil Saints*. New Delhi: Motilal Banarsidass Publisher.
- Peterson, M. N., Birckhead, J. L., Leong, K., Peterson, M. J., and Peterson, T. R. (2010). Rearticulating the myth of human-wildlife conflict. *Conserv. Lett.* 3, 74–82. doi: 10.1111/j.1755-263X.2010.00099.x
- Pimm, S. L., Russell, G. J., Gittleman, J. L., and Brooks, T. M. (1995). The future of biodiversity. *Science* 269, 347–350. doi: 10.1126/science.269.5222.347
- Pooley, S., Bhatia, S., and Vasava, A. (2021). Rethinking the study of human-wildlife coexistence. *Conserv. Biol.* 35, 784–793. doi: 10.1111/cobi.13653
- Praet, I. (2013). The positional quality of life and death: a theory of human-animal relations in animism. *Anthrozoös* 26, 341–355. doi: 10.2752/175303713X13697429463510
- Puyravaud, J.-P., and Davidar, P. (2013). The Nilgiris biosphere reserve: an unrealized vision for conservation. *Trop. Conserv. Sci.* 6, 468–476. doi: 10.1177/194008291300600401
- Rajan, S., Sethuraman, M., and Mukherjee, P. K. (2002). Ethnobiology of the Nilgiri Hills, India. *Phytother. Res.* 16, 98–116. doi: 10.1002/ptr.1098
- Redpath, S. M., Bhatia, S., and Young, J. (2015). Tilting at wildlife: reconsidering human-wildlife conflict. *Oryx* 49, 222–225. doi: 10.1017/S0030605314000799
- Redpath, S. M., Young, J., Evely, A., Adams, W. M., Sutherland, W. J., Whitehouse, A., et al. (2013). Understanding and managing conservation conflicts. *Trends Ecol. Evol.* 28, 100–109. doi: 10.1016/j.tree.2012.08.021
- Shaji, K. A. (2021). *An Elephant Corridors Raises Conflict in the Nilgiris*. Mongabay. Available online at: <https://india.mongabay.com/2021/02/an-elephant-corridor-raises-conflict-in-the-nilgiris/> (accessed March 15, 2021).
- Singh, C. (1986). *Common Property, Common Poverty: Indias Forests, Forest Dwellers and the Law*. Delhi: Oxford University Press.
- Sitati, N. W., Walpole, M. J., Smith, R. J., and Leader-Williams, N. (2003). Predicting spatial aspects of human-elephant conflict. *J. Appl. Ecol.* 40, 667–677. doi: 10.1046/j.1365-2664.2003.00828.x
- Srinivasaiah, N. M., Anand, V. D., Vaidyanathan, S., and Sinha, A. (2012). Usual populations, unusual individuals: insights into the behavior and management of Asian elephants in fragmented landscapes. *PLoS ONE* 7:e42571. doi: 10.1371/journal.pone.0042571
- Taghioff, D., and Menon, A. (2010). Can a tiger change its stripes? The politics of conservation as translated in Mudumalai. *Econ. Polit. Week.* 45, 69–76. Available online at: <https://www.jstor.org/stable/40736732>
- Thekaekara, T. (2010). Conservation in mudumalai: another politics. conservation in mudumalai: another politics. *Econ. Polit. Week.* 45, 78–80. Available online at: <https://www.jstor.org/stable/25742050>
- Thekaekara, T. (2018). “Thinking like an elephant, looking beyond protected areas,” in *Conservation and Development in India: Reimagining Wilderness*, ed S. Bhagwat (Milton Keynes: Routledge). doi: 10.4324/9781315685908-5
- Thekaekara, T., and Thornton, T. F. (2016). “Ethnic diversity and human-elephant conflict in South India,” in *Conflict, Negotiation, and Coexistence: Rethinking Human-Elephant Relations in South Asia*, eds P. Locke and J. Buckingham (New Delhi: Oxford University Press). doi: 10.1093/acprof:oso/9780199467228.003.0014
- Thornton, T. F., Mangalagiu, D., Ma, Y., Lan, J., Saysel, A. K., and Chaar, A. M. (2020). Cultural models of and for urban sustainability: assessing beliefs about Green-Win. *Clim. Change* 160, 521–537. doi: 10.1007/s10584-019-02518-2
- Thurston, E., and Rangachari, K. (1909). *Castes and Tribes of South India*. Madras: Madras Government Press.
- Treves, A., and Bruskotter, J. (2014). Tolerance for predatory wildlife. *Science* 344, 476–477. doi: 10.1126/science.1252690
- Wallach, A. D., Jasinghe, S., Fernando, S., and Rizzolo, J. B. (2020). Compassionate conservation and elephant personhood. *Anim. Senti.* 5:16. doi: 10.51291/2377-7478.1576
- White, L. (1967). The historical roots of our ecologic crisis. *Science* 155, 1203–1207. doi: 10.1126/science.155.3767.1203
- Wilbur, R. C., Lischka, S. A., Young, J. R., and Johnson, H. E. (2018). Experience, attitudes, and demographic factors influence the probability of reporting human-black bear interactions. *Wildl. Soc. Bull.* 42, 22–31. doi: 10.1002/wsb.854
- Woodburn, J. (1982). Egalitarian societies. *Man* 17, 431–451. doi: 10.2307/2801707
- Young, J. C., Marzano, M., White, R. M., McCracken, D. I., Redpath, S. M., Carss, D. N., et al. (2010). The emergence of biodiversity conflicts from biodiversity impacts: characteristics and management strategies. *Biodivers. Conserv.* 19, 3973–3990. doi: 10.1007/s10531-010-9941-7

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